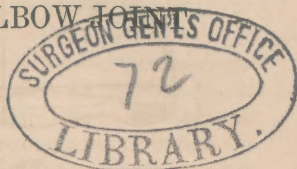


Swinburne (J)

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# A NEW METHOD FOR THE TREATMENT OF FRACTURES AND DISLOCATIONS, WITH FRACTURES IN AND NEAR THE ELBOW JOINT

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The object of this paper is more fully to elucidate the treatment of fractures and dislocations of the elbow-joint, and particularly in children.

I had supposed that the subject matter of the mode of treatment by simple extension; counter extension, and maintenance of the same, had been so fully demonstrated in my paper read before the New York State Medical Society, for the year 1861, as not to require any more demonstration. I find, however, that many of the profession are still in doubt as to the mode of application. I propose not only to simplify the treatment, but also the apparatus, which can be readily made with the appliances almost always on hand. The material required is a piece of shingle, cigar-box, or any thin strip of wood readily procured.—See Plate No. 1, Fig. 3.

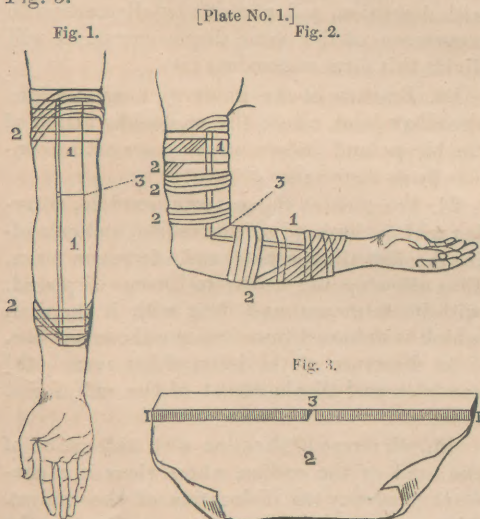
Some adhesive plaster—Fig. 3, No. 2—or its equivalent, some adhesive material like Burgundy pitch, or black wax, etc., with which a piece of leather or cloth can be covered, the bits of splints encircled or enveloped, so as to form a hinge.—Fig. 1, No. 1. One end of the splint can extend to about the termination or insertion of the deltoid muscle, and the other portion may extend to near the wrist.—No. 2, 2, Fig. 1.

This must be applied to the arm in the extended position; the ends are secured to the arm and fore-arm severally by strips of adhesive plaster, applied in a serpentine or spiral direction, to secure the ends of the apparatus from slipping up or down,—Fig. 1, No. 2, 2—then flex the fore-arm upon the arm, and the required degree of extension is affected, after which the elbow can be secured to the apparatus.—Nos. 2, 2, 2, 2, Fig. 2.

The hinge—No. 3, Figs. 1, 2, 3—can be relieved from too much angular pressure by a small compress on either side of the sharp angle, formed by the joint of the apparatus.—No. 4, Fig. 2. The flexion of this apparatus produces *extension and counter-extension* and at the same time presses the humerus posteriorly, while the radius and ulna are forced downwards, replacing the fractured bones.

As an experiment, apply the same without fixing the ends of the angular apparatus, (Day's, or the Rose splint,) with a bandage; flex the arm, and it will be found that the ends are moved up on the arm and drawn on the fore-arm, thereby losing all the extension which would otherwise be obtained by the change in the relative position of the hinge in the apparatus and the bones of the arm.

The following diagrams illustrate the principle of extension by means of this apparatus:



- Figs. 1 and 2.
1. Splint with joint.      3. Joint of instrument.  
2. Adhesive plasters.      4. Compress.
- Fig. 3.
1. Board without cover.      2. Adhesive plaster.  
3. Joint to be made by adhesive plaster.



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[Plate No. 2.]

Fig. 1.

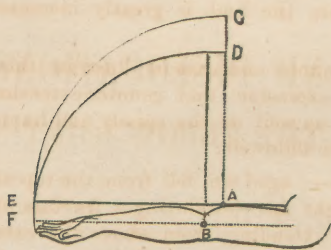
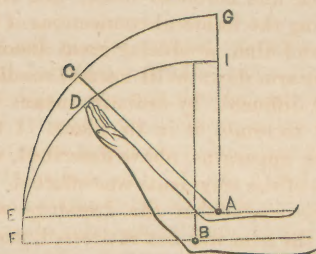


Fig. 2.



A. Fig. 1 and 2, is the joint of the instrument; B is the elbow-joint. The joint A is about one or one and a half inches above the joint B, and from one and a quarter to three inches in front of it. The end of the instrument and the fore-arm extend to the same point. Now, semiflex the fore-arm, and the splint will extend farther than the fingers by the distance C D, Fig. 2, and when the flexion extends to a right angle, the difference is G I.

It is plain, therefore, that if the hand be made fast to the end of the instrument while extended, then, when it is flexed, the hand and the end of the instrument will describe the same circle, and both extend to the point a, the fore-arm being forcibly extended, the amount of extension being proportional to the diameter of the arm—in other words, the vertical distance between the joints of the arm and instrument respectively, and also the horizontal distance between them, so that, by means of this simple arrangement, sufficient extension is made to continue prolonged reductive efforts in old standing dislocations, and to keep recent ones reduced, which might otherwise be troublesome.

The principle involved may be illustrated very easily by simply placing a bit of board on the fore-arm, from the fingers to the elbow, fixing it at the joint with the other hand, and then flexing, when it will be seen that the splint extends two inches or more beyond the fingers, as seen in Fig. 2, compared with Fig. 1.

The following sketch will demonstrate the principle more fully:—

Fig. 1, No. 1, represents the distorted fracture; Fig. 1, Nos. 2, 3, 4, and 5, represents the ap-

paratus and dressings applied; Fig. 2, No. 1, represents the fracture reduced by the flexion; Fig. 2, Nos. 2, 3, 4, and 5, apparatus and dressings.

[Plate No. 3.]

Fig. 1.

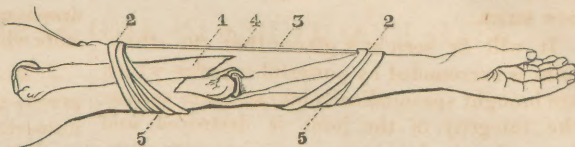
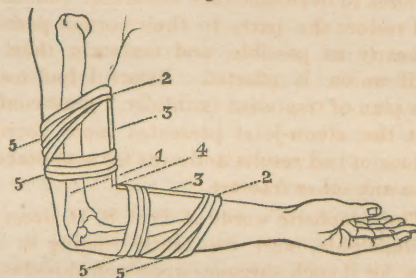


Fig. 2.



No. 1, Fig. 1 Fracture and displacement.

No. 1, Fig. 2. " " " replaced by flexion.

No. 2, Figs. 1 and 2. Extension and counter-extension.

No. 3, Figs. 1 and 2. Splint.

No. 4, Figs. 1 and 2. Joint of Splint.

Nos. 5, 5, 5, 5, Figs. 1 and 2. Adhesive plaster.

The form of accident to which this apparatus is especially applicable are those occurring in or near the elbow-joint, sometimes accompanied with distortion, and a continued disposition to recurrence of the same displacement. I will divide this form of accident into

1st. Fracture of the humerus, near and into the elbow-joint, where the spasmodic action of the biceps and triceps muscles are acting constantly as distorters.

2d. Fracture of the external condyle, carrying with it the head of the radius, and extending through the coronoid and olecranon fossæ, thus allowing the radius to become displaced, with its fragment, and drag with it the ulna which is unloosed from its natural connections.

3d. Fracture of the internal (or even both) condyles and displacement of the radius and ulna.

4th. Fracture of the ulna with dislocation of the head of the radius, where there is a constant tendency to dislocation of the radius. This was exemplified a few days since in the person of a neighboring physician who met with this accident, and it was reduced by an able surgeon; but instead of applying some retentive apparatus, he merely carried the hand of the



dislocated arm over the shoulder of the same side, and maintained it in that position; subsequently radius re-dislocated; the ulna shortened leaving deformity for life.

See also case reported of old accident, MEDICAL AND SURGICAL REPORTER, Vol. 3d, No. 11, new series.

It will be seen at a glance that the elbow-joint is surrounded by powerful muscles which are brought spasmodically into action as soon as the integrity of the joint is destroyed, and hence the absolute necessity of some antagonistic force to overcome this abnormal condition, and restore the parts to their normal position as nearly as possible, and maintain them so until union is effected. Before I had tested this plan of treatment faithfully, I must confess that the elbow-joint presented more horrible visions of bad results and suits for mal-practice than any other fracture.

The prophetic words of Prof. S. D. Gross, of Philadelphia, were constantly ringing in my ears, for if such surgeons approach this class of fracture with "doubt and misgiving," what would the young and perhaps inexperienced surgeon do? They would be bold, indeed, to approach with less trepidation.

In reference to fractures of the lower portion of the humerus and involving the joint, he says: "I know of no fractures which I approach with more doubt and misgiving than those of the inferior extremity of the humerus, involving the elbow-joint. I know of none which are more liable to be followed by severe inflammation of the synovial membrane—extensive effusion, ankylosis and deformity. Even in the more simple forms of these injuries and where the treatment has been most skillfully conducted there is generally great risk of an unfavorable result; at all events a long time will be sure to elapse before there will be anything like good use of the articulation. The prudent surgeon will, therefore, inform his patient at the commencement of the attendance, of the nature and probable consequences of the case. From five to six weeks is the average period necessary for the reunion. The nature of the deformity in badly treated fracture of the condyles of the humerus, may exhibit itself in quite a variety of ways depending upon the peculiar mode of treatment. Sometimes a posterior projection remains, caused by the displacement of the lower end of the bone backwards; not unfrequently the limb has a strangely twisted appearance, either in the direction

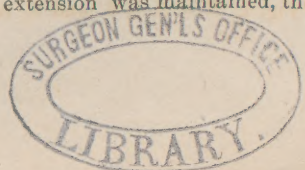
of pronation or supination; occasionally it is permanently flexed or extended, and sometimes again the limb is greatly increased in breadth."

I will quote one case to illustrate this method by extension and counter-extension of dressings, as well as the speedy and happy results which followed:

J. Mc—, aged ten, fell from the top of the privy—eight feet—producing a fracture of the humerus, extending from above the external condyle of the humerus obliquely through the olecranon and coronoid fossæ, and effectually destroying the humeral connections of both the radius and ulna, producing great distortion. I drew the arm down to its normal condition, but found it difficult by ordinary means (angular splints) to retain it in its place. I then applied the apparatus, above described, when apposition of the fragments was effected. During the three weeks that the dressings were continued, the arm was not re-dressed, except that a few additional pieces of straps may have been added to keep the apparatus in its place, and during that time I saw him not more than four or five times. At three weeks all dressings were removed, passive motion allowed, and at the end of six weeks the motion of the elbow was perfect, though the bony callus left an appearance of deformity. My friends and myself have now treated fifteen cases of this class of accident, involving deformity of the elbow-joint, with much better results than I have been able to obtain by the mere retentive splints. This plan only requires a fair trial to be fully appreciated. It is merely the *extension and counter-extension* applied to the joint, but by a different mode of procedure.

Now, for all these accidents or results there must be some reason, and one is led naturally to inquire its real nature, and why *union is delayed five or six weeks*. Is it the close proximity of the joint? The presence of synovia? The canceled structure of the bone? The smallness of the fragments, and its consequent slight vitality? Or, is it not rather an insufficient reduction and extension of its several parts?

If the bones were properly reduced and retained, there would be little distortion when union is complete; and certainly there is little difficulty of extending the limb to its normal condition, and when so extended, nearly all deformity ceases, and who can pretend that if this position of extension was maintained, the





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limb would not be quite natural, and all the deformities, above spoken of, made to disappear.

If these indications are fulfilled can any one, for a moment, suppose that "*from five to six weeks as an average period would be necessary for reunion.*"

The nearer the fragments of bone are in apposition the sooner they will unite, and unless bony deposit shall be thrown out, there is absolutely little or no callus at the end of three months where apposition is perfect.

Lately I have had eminent surgeons examine carefully fractures of the femur, humerus, tibia and fibula, Collis fracture of the radius, and in most of them they were unable to discover any callus, or to distinguish the broken from the unbroken limb. The Collis fracture was examined by Doctor Elisha Harris, of New York, (when on a visit to this city in connection with his Sanitary Mission by order of United States Government,) and though at the time of the accident there was great contusion and distortion, no redressing from the time of the accident to the 22d day when all dressings were discontinued, union being perfect and fair motion.

Six months after the accident the Doctor examined it, and found it so perfect that he was absolutely unable to state which had been broken, there being no callus. Then, as a maxim, we can state that the less distortion, the less callus, and visa versa. So that if we can obtain absolute apposition of the fragments of bones entering into the joints, we can as well avoid excessive bony callus in this position, as in the radius, tibia, femur, or any other bone. Take for example, a simple transverse fracture without distortion, and who ever expected excessive bony callus, or a retardation of bony union. On the contrary, take an over-lapped fracture of any angle, and let it unite in that position, the union would be slow, and the bony callus would be great, and would absolutely constitute a deformity. Then to avoid deformity and immobility of joints place them in apposition as nearly as possible and keep them there until they are consolidated firmly together. This cannot be effected until spasmodic muscu-

lar contraction is overcome. There are two ways of effecting this end, compression by bandaging, and overcoming the spasm by permanent extension, without compression with bandages. Experience tells me which of the two to choose.

The advantages of this mode of placing the fracture in place, and retaining it, can be briefly summed up as follows:

1st. The dressing (splints) is easily and readily made, and hence not expensive; and always at hand.

2d. *Extension and Counter-extension* is effected by simple flexion of the fore arm upon the arm, i.e., changing the relation of the joints of the arm and splint respectively by simple flexion. (See cuts.)

3d. It can be examined at pleasure, while motions do not disturb the dressings.

4th. The swelling is much less than where the parts are constricted by bandaging, and if there is too much swelling, the plaster can be cut down the back of the arm so as to allow it to accommodate itself to the swelling, during the subsidence of which others can be added at pleasure, without removing the old plaster or apparatus, and hence no entire re-dressings of the limb becomes imperative; in fact, it is better not to disturb the relations of the parts, when once replaced, until union takes place, when motion is gradually made according to rules laid down in all works on surgery.

5th. The ultimate restoration of the joint to its normal usefulness is obtained much sooner, for this reason, that there is less infiltration and subsequent inflammation where there is little pressure from the apparatus and bandages, than where compression is the means used to prevent re-distortion of the joint or fracture.

6th. The swelling which may ensue does not change the relation of the dressings, or jeopardize the vitality of the parts.

7th. There is no slipping of the apparatus from shortening and distortion of the joint, as in the case where a simple angular apparatus is used without the two fixed points designated in the annexed cuts.